

WHAT IS CLAIMED IS:

1. A method for making a through-hole in a silicon substrate comprising the steps of:

forming a high-impurity-concentration region in the periphery of a through-hole-forming region at a first surface of the silicon substrate;

forming an etching stop layer over the through-hole-forming region and the high-impurity-concentration region;

forming a mask layer having an opening on a second surface of the silicon substrate, the second surface being opposite to the first surface;

etching the silicon substrate at the opening through the mask layer until the etching stop layer is exposed to the second surface;

further etching the silicon substrate until the etched portion extends to the high-impurity-concentration region; and

removing the etching stop layer at least at the portion exposed to the second surface.

2. A method for making a through-hole according to Claim 1, wherein the high-impurity-concentration region has an impurity concentration of $1 \times 10^{19}/\text{cm}^3$ or more.

3. A method for making a through-hole according to Claim 2, wherein the high-impurity-concentration region has an impurity concentration of $7 \times 10^{19}/\text{cm}^3$ or more.

4. A method for making a through-hole according to Claim 1, wherein the impurity is selected from the group consisting of boron, phosphorus, arsenic, and antimony.

5. A method for making a through-hole according to Claim 1, wherein the high-impurity-concentration region has a width of 1 to 20 μm and a depth of 1 to 3 μm .

6. A method for making a through-hole according to Claim 1, wherein the high-impurity-concentration region is formed by forming an impurity diffusion layer in the first surface of the silicon substrate.

7. A method for making a through-hole according to Claim 1, wherein the etching stop layer comprises a silicon nitride film formed by low-pressure vapor deposition (LP-SiN).

8. An ink-jet printer head comprising an ink supply

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port fabricated by a method for making a through-hole according to any one of Claims 1 to 7.